

What is claimed is:

1. A rear projection screen for use with a projection lens which has an exit pupil, said screen having a light entering side and a light exiting side and comprising in order from said light entering side to said light exiting side:

- (a) a Fresnel structure;
- (b) a lenslet array; and
- (c) an opaque layer comprising a plurality of holes, said holes being at locations which correspond to the images of the exit pupil formed by the combination of the Fresnel structure and the lenslet array.

2. The screen of Claim 1 wherein the lenslet array comprises elements which have a square aperture.

3. The screen of Claim 2 wherein, in viewer space, the screen has a half field of view α given by:

$$\alpha = \tan^{-1}(0.5 \cdot CA/f)$$

where CA and f are, respectively, the clear aperture and the focal length of the elements.

4. The screen of Claim 1 wherein the lenslet array comprises elements which have a rectangular aperture.

5. The screen of Claim 4 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA_v/f)$$

and a horizontal half field of view α_h given by:

$$\alpha_h = \tan^{-1}(0.5 \cdot CA_h/f)$$

where CA_v , CA_h , and f are, respectively, the vertical clear aperture, the horizontal clear aperture, and the focal length of the elements.

6. The screen of Claim 1 wherein the lenslet array comprises anamorphic elements.

7. The screen of Claim 6 wherein, in viewer space, the screen has a vertical half field of view α_v given by:

$$\alpha_v = \tan^{-1}(0.5 \cdot CA/f_v)$$

and a horizontal half field of view α_H given by:

$$\alpha_H = \tan^{-1}(0.5 \bullet CA/f_H)$$

where CA, f_v , and f_H are, respectively, the clear aperture, the vertical focal length, and the horizontal focal length of the elements.

8. The screen of Claim 1 further comprising a protective layer on the light exiting side of the opaque layer.
9. The screen of Claim 8 wherein the Fresnel structure, the lenslet array, the opaque layer, and the protective layer are arranged as subassemblies.
10. The screen of Claim 9 wherein the Fresnel structure and the lenslet array are arranged in one subassembly and the opaque layer and the protective layer are arranged in another subassembly.
11. The screen of Claim 1 wherein the screen is for use with a pixelized panel and the lenslet array comprises elements whose size is at least several times smaller than the magnified image of a pixel produced at the array by the projection lens.
12. The screen of Claim 1 wherein the screen is for use with a cathode ray tube and the lenslet array comprises elements whose size is at least several times smaller than the magnified image of a dot spot of the cathode ray tube produced at the array by the projection lens.
13. A rear screen projection system comprising a projection lens having an exit pupil and the screen of Claim 1.
14. The rear screen projection system of Claim 13 wherein the Fresnel structure has a front focal distance and the distance from the exit pupil of the projection lens to the screen is equal to said front focal distance.